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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/900,743	07/06/2001	Yu-Chong Tai	06618/662001 /SIT 3252	4560
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FISH & RICHARDSON, PC 4350 LA JOLLA VILLAGE DRIVE SUITE 500 SAN DIEGO, CA 92122			EXAMINER ELLINGTON, ALANDRA	
			ART UNIT	PAPER NUMBER

2855

DATE MAILED: 05/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/900,743

Applicant(s)

TAI ET AL.

Examiner

Alandra N Ellington

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15, 28-46, and 60-64 is/are pending in the application.
- 4a) Of the above claim(s) 16-27 and 47-59 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 28-46, and 60-64 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-15, 28-46 and 60-64 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____

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Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-15, 28-46, and 60-64 drawn to a device, classified in class 73, subclass 754.
- II. Claims 16-27 and 47-59, drawn to a method, classified in class 29, subclass 846.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process such as molding.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Scott C. Harris on 5/13/02 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-15, 28-46, and 60-64. Affirmation of this election must be made by applicant in replying to this Office action. Claims 16-27 and 47-59 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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DETAILED ACTION

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because: A space is needed after ---AND---.

The specification to which the oath or declaration is directed has not been adequately identified. See MPEP § 601.01(a).

Drawings

The drawings are objected to because: In Fig. 1, the word ---piezoresistive--- should be inserted after "micromachined" (pg. 4, line 25). Also, unable to distinguish the difference between "polysilicon piezoresistor" and "strain sensitive resistor 102". "Polysilicon piezoresistor" and "Nitride diaphragm" need to have reference characters assigned or be deleted from figure. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to because: In Fig. 3A, it is unclear the difference between "nitride" and "silicon nitride 302". In Fig. 3B "nitride", "PSG", and unknown arrow should be

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deleted from figure or be assigned reference characters. In Fig. 3C, "nitride" should be deleted or assigned a reference character and it is unclear to what "step up anchor 323" is referring. In Fig. 3D, "nitride", "vacuum cavity", and "step-up anchor" should be deleted or assigned reference characters. In Fig. 3E, "polysilicon" should be deleted or assigned a reference character. In Fig. 3F, it is unclear to what "aluminum 352" and "contact holes 352" are referring. Also, in Fig. 3F, "Al" should be deleted or assigned a reference character. In Fig. 4, "Al pads" should be deleted or assigned a reference character. Figs. 4-6 are unclear because they are too dark. In Fig. 6, "polysilicon thermistor", "pressure sensor", and "4 nitride diaphragms" should be deleted or assigned reference characters. Also, in Fig. 6, all the elements in the Wheatstone bridge should be assigned reference characters. In Fig. 8, "step-up anchor ...", "Bird's peak", and "crack" should be deleted or assigned reference characters. In Fig. 9, it is unclear to what "silicon substrate 905", "diameter 902", and "vacuum cavity 910" is referring. Also, in Fig. 9, "SiN diaphragm" should be deleted or assigned a reference character. It is unclear to what Figs. 10D-10F are showing. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: In Fig. 3C, polysilicon films 340" (pg. 10 line 20). In Fig. 3F, "passivation layer 350" and/or "silicon nitride layer 350" (pg. 11 lines 16-17). In Fig. 4, "aluminum pads 400" (pg. 11 line 22). In Fig. 6, "four silicon nitride diaphragms 500, 502, 504, 506" (pg. 12 lines 1-2). A proposed drawing correction

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or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: In Fig. 8, reference character "800". A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a) because they fail to shown, in Fig. 10D, ---multiple silicon nitride layers--- as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Figure 13 is objected to because it is unclear what is being shown. Also, there is an arrow that has no reference character. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 12-14, 33-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites "formed on a device other than said diaphragm layer". This statement is unclear. What is "device" referring to? Is the additional resistor formed on the substrate or the device?

Claim 33 recites "said membrane having an outer size from edge into the other which is less than 100 microns". This statement is unclear and indefinite because what does "an outer size from the edge into the other" refer to? It is unclear to what "other" refers to in respect to the surface micromachined pressure sensor.

Claim 43 recites "at least one additional resistor" which makes the statement indefinite and ambiguous because it refers to there being other resistors previously mentioned.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15, 28-46, 60-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seefeldt et al in view of Sparks and Buhl et al.

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Seefeldt et al discloses a device 4 comprising of a substrate 8, pressure sensor 10, diaphragm 11, vacuum cavity 22, piezoresistors 38, polysilicon layer 90, anchor cavities 70, silicon nitride layer 18, and strain sensitive resistor 12. However, Seefeldt et al does not specifically teach a surface micromachined pressure sensor and capacitive sensor (cl 1, cl 7, cl 46). Also, Seefeldt et al does not teach a Wheatstone bridge and dummy diaphragm (cl 3, cl 13-cl 14).

Sparks teaches a surface micromachined pressure sensor 54, substrate 18, and a capacitive sensor (Fig. 4) for the purpose of forming sensing devices (cl 1, cl 7, cl 46).

Buhl et al discloses a dummy diaphragm 142, strain sensitive resistors (Fig. 6) arranged into a Wheatstone bridge 41 for the purpose of connecting the strain sensitive resistors with the bridge circuitry to measure changes in the resistance of piezoresistive elements (cl 3, cl 13-cl 14).

Since Seefeldt et al, Sparks, and Buhl et al are all from the same field of endeavor, the purpose disclosed by Sparks and Buhl et al would have been recognized in the pertinent art of Seefeldt et al.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify Seefeldt et al with the teachings of Sparks and Buhl et al as noted above to include a dummy diaphragm, strain sensitive resistors arranged in a Wheatstone bridge, surface micromachined pressure sensor, and a capacitive sensor for the purpose of forming an improved sensing device.

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Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. Nagase et al. U.S. Patent 5,872,315 discloses a pressure detecting apparatus.
2. Dublin, Jr. U.S. Patent 6,068,394 discloses a method and apparatus for providing dynamic data during drilling.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alandra N. Ellington whose telephone number is (703)305-4449. The examiner can normally be reached on Monday - Thursday, 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Fuller can be reached on (703)308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are (703)306-7725 for regular communications and (703)305-3839 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-1782.

Alandra Ellington
A.U. 2855

AE
May 17, 2002


Benjamin R. Fuller
Supervisory Patent Examiner
Technology Center 2800

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